

Tropic, Utah Community Transportation Plan



Draft Report • Meetings Held November 8–9, 2006

February 2, 2007

Mayor Lowell J. Mecham
Town of Tropic
40 North 300 West
P.O. Box 130
Tropic, UT 84776

Dear Mayor Mecham:

Attached is the final copy of the Community Transportation Plan (CTP) developed for the Town of Tropic with edits from your recent comments. This CTP is a tool to help guide transportation decisions in your community, which will help meet the transportation visioning discussed during the public meetings held November 8-9, 2006.

It is anticipated that this document will be presented to the Tropic Town Council for their approval. It is important to restate that a CTP is a living document that changes as your city changes. We encourage you to revise the CTP as frequently as necessary to meet your needs.

We would be happy to attend the city council meeting when this document is presented to answer any questions that may arise. Please contact Mr. Tim Boschert (801) 965-4175.

Thank you again for allowing us to help you develop your Community Transportation Plan. We always value public input regarding the state highway system. The town of Tropic has provided us valuable insight for our Statewide Long-Range Planning Process.

Sincerely,

John Thomas, P.E.
Engineer for Transportation Planning

JT/mj

Enclosure

cc: Dal Hawks, UDOT Region 4 Director
Myron Lee, UDOT Region 4 Public Involvement Coordinator
Tim Boschert, UDOT Planning



Town of Tropic Community Transportation Plan

November 8-9, 2006

Prepared as a community involvement project by:

Town of Tropic

UDOT Planning Section

Town of Tropic

Community Transportation Plan

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Lowell J. Mecham

City Council

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Jim England

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Robert Harman

David Jacobsen

April Roberts

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**If available for the study*

Tropic Community Transportation Plan

1. Introduction

1.1. Background

Early Mormon settlers - many of whom had previously lived in Cannonville founded the town of Tropic, located in the valley below the Paunsaugunt Plateau.



Ebenezer and Mary Bryce

These settlers realized that there was a need for more water if they were to be able to irrigate crops and sustain themselves in this area. There had been talk of the possibility of diverting water from the East Fork of the Sevier River to the Bryce Valley area, and in 1878 Ebenezer Bryce, for whom Bryce Canyon is named, surveyed a possible route for a 15 mile canal which would be necessary if the diversion were to take place. The canal was not built at the time, but Bryce did construct a home, complete an irrigation ditch 2 miles long from Paria Creek, and built a road into the Bryce Canyon area to acquire timber and firewood. This road ended at what

is commonly called the amphitheater, and local people who used it called it Bryce's Canyon.

In 1889 William Lewman, a surveyor and teacher, again presented the idea of the East Fork water diversion to the people of the Bryce Valley area, and another prominent settler, Andrew J. Hansen, suggested forming the East Fork Irrigation Company as a means of financing the project. Mr. Hansen also bought the Bryce Canyon water (now called Spring Creek) from John Hatch for \$350.00 This water was to be used for the new town of Tropic.

A final survey of the canal route was done, and in September 1889, work began in earnest on the 14 mile long canal which resulted in diverting the water that normally drained into the Great Basin into the Colorado Basin. This was a great feat and one that has never been duplicated.

The canal project was finally finished after more than 2 years work, and on May 23, 1892, at 4 p.m. the water entered what is now the town of Tropic near Andrew J. Hansen's home. That was the day of the "birth" of Tropic, and is celebrated as such today.

The new town of Tropic was surveyed by Mr. William Lewman, according to the history of A. J. Hansen. Sixteen

Tropic Community Transportation Plan

blocks were laid off and divided into 64 lots of 1 ½ acres each. The Bryce Canyon Water was also divided into 64 shares. The lots and one share of water were then placed on the market for the price of \$7.50.



The name of the town was a matter of much discussion. The names of Ur, Hansen, and Erastus were suggested, then rejected. Mr. Hansen suggested the name of Tropic because the area was the first indication of a mild climate after the very high, cold country of the plateau and could produce fruits and vegetables not grown in the surrounding areas. This suggestion was accepted by the people of the community, thus the town was named Tropic.

(History taken from Tropic General Plan)

1.2. Study Need

Although currently a small community, Tropic has seen a 35.83% population increase over the last decade (1990-2000). The population in 2005 was 463 according to the Utah Population Estimates Committee. A well-established transportation plan is needed to provide direction for continual maintenance and improvements to Tropic's transportation system.

With the increasing population of Tropic and the increasing tourist traffic in the area, the need for system improvements and a more extensive transportation plan is necessary for both Tropic and the surrounding area.

Some of the major transportation issues noted from around the State are as follows:

- Safety
 - Railroad crossings
 - Trails (bicycle, pedestrian, and OHV)
 - Signals
 - City interchange aesthetics
 - Connectivity of roadways
 - Property access
-

Tropic Community Transportation Plan

- Truck traffic
- Alternate routes
- Speed limits

Tropic recognizes the importance of building and maintaining safe roadways, not only for the vehicle traffic, but also for pedestrians and bicyclists.

1.3. Study Purpose

The purpose of this study is to assist in the development of a community transportation plan for the Town of Tropic. Tropic could adopt this plan as a companion document to the City's General Plan. With the community transportation plan in place the Town may also qualify for grants from the State Quality Growth Commission.

The primary objective of the study is to establish a solid community transportation plan developed from community issues and concerns to guide future developments and roadway expenditures. The plan includes two major components:

Short-range action plan

Long-range transportation plan

Short-range improvements focus on specific projects to improve deficiencies in the existing transportation system.

The long-range plan will identify those projects that require significant advanced planning and funding to implement and are needed to accommodate future traffic demand within the study area.

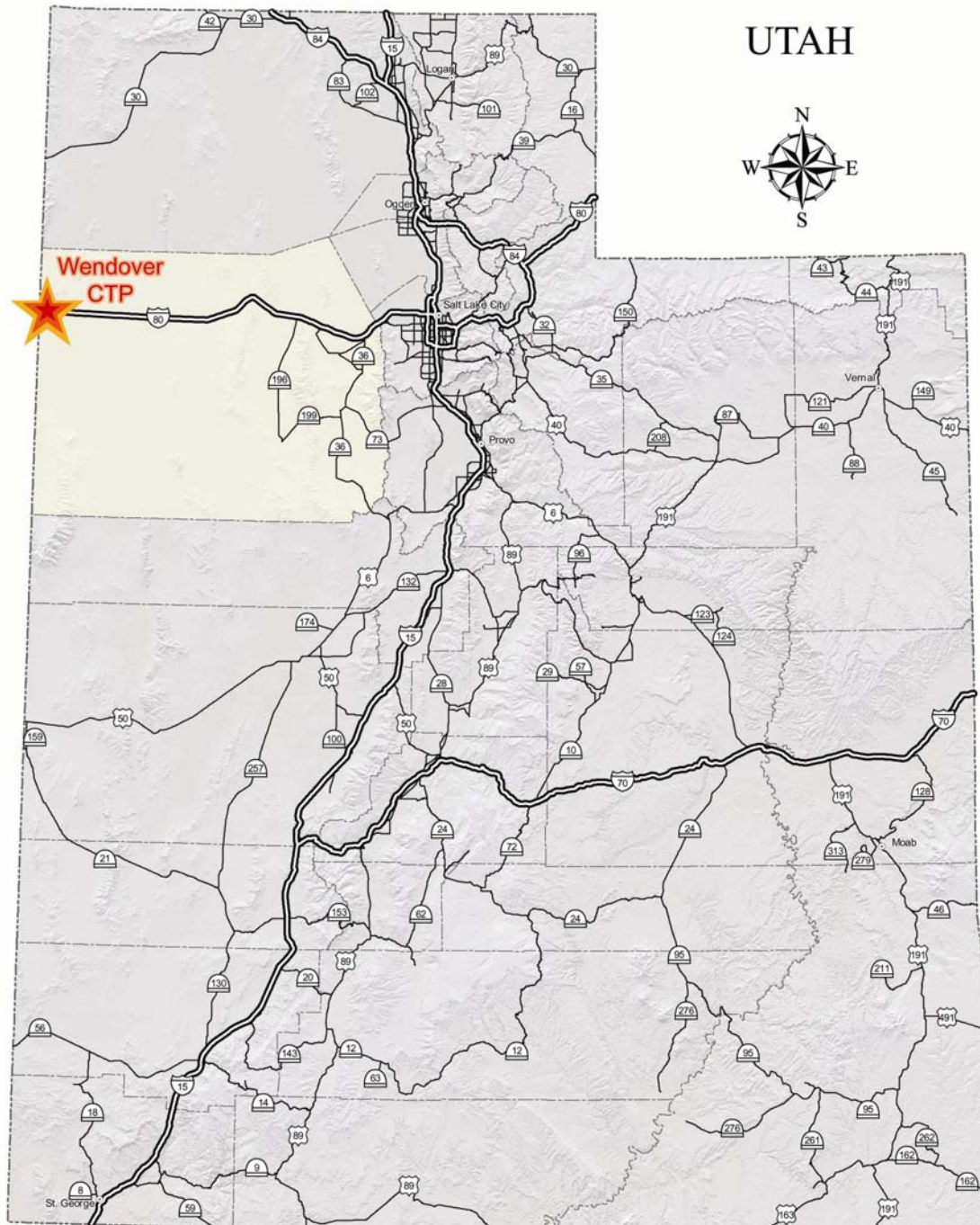


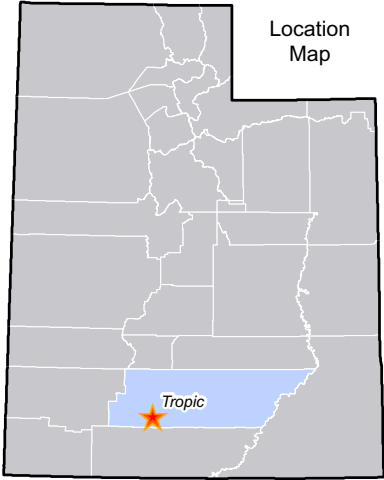
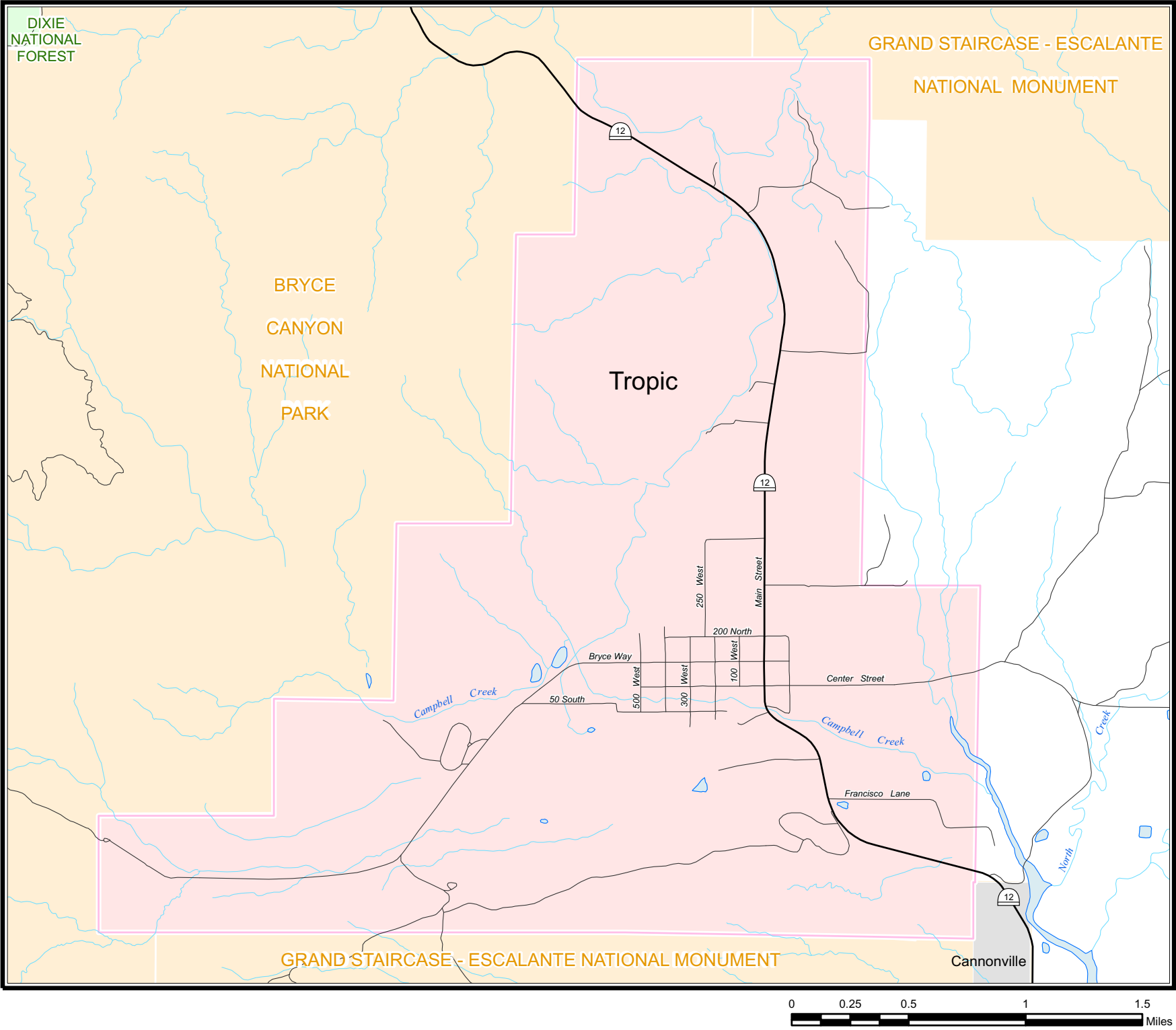
1.4. Study Area

The study area is Tropic, Utah and land adjacent to it. A general location map is shown in Figure 1-1. A more detailed map of the study area and City limits is shown in Figure 1-2. The roadway network within the study area includes State Route 12 (Main Street) and other local roads.

Town of Tropic Community Transportation Plan

Figure 1-1. Study Area Map





- State Roads
- Other Roads
- Streams
- Study Boundary
- Tropic
- Cannonville
- National Forests
- National Parks, Monuments and Recreation Areas

Figure 1-2
Study Vicinity Map

1.5. Study Process

The Study, which began in November 2006, is proceeding as a cooperative effort between the Town of Tropic, UDOT, and local community members. It is being conducted under the guidance of Tropic Officials.

The following individuals participated in the initial meetings to provide input used to create this document. This group listed below will be referred to as the Technical Advisory Committee, or “TAC,” for this document.



- Lowell Mecham, Mayor
 - LaMar Feltner, City Council
 - Jim England, City Council
 - Sandra Francisco, City Council
 - Marie Niemann, Town Clerk /
 - Clare Ramsay, Resident
 - Jeanee Shakespeare, Resident
 - David Jacobsen, Planning Comm.
 - Megan James, UDOT
 - Clayton Wilson, UDOT
 - Tim Boschert, UDOT
-

Town of Tropic Community Transportation Plan

The study process for the Tropic Community Transportation Plan consists of three basic parts: (1) inventory and analysis of existing conditions, (2) projection of future conditions, and (3) development of a community transportation plan (CTP). This process involves the participation of the TAC for guidance, review, evaluation and recommendations in developing the CTP to include development of future projects for the identified study area.



The TAC will evaluate each part of the study process. Their comments will be incorporated into the study's final report draft. The remainder of the final report draft will focus on the recommendation and implementation portion of the transportation plan program.

Transportation projects that will be recommended for the short-term and long-range needs will be developed based on the TAC's recommendations and concurrence.

The study process allows for the solicitation of input from the public at two TAC workshops. This public participation element is included in the study process to ensure that any decisions made regarding this study are acceptable to the community.

The first TAC workshop provides an inventory and analysis of existing conditions and identification of needed transportation improvements. The second TAC workshop will focus on prioritization of projects, estimation of project costs, and discussion of the funding processes.

The TAC is expected to recommend those comments that are to be incorporated into the report and applicable to the goals of this study. The final report draft will be submitted to the City for review and comments.

Upon local review of the draft report, UDOT will prepare appropriate changes and submit the final report to the City for approval. The final report will describe the study process, findings and conclusions, and will document the recommended transportation system projects and improvements.

2. Existing Conditions

An inventory and evaluation of existing conditions within the study area was conducted to identify existing transportation problems or issues. The results of the investigation follow.

2.1. Land Use

In order to analyze and forecast traffic volumes, it is essential to understand the land use patterns within the study area. Much of the Town is zoned Residential, but there are also many areas zoned for agricultural and commercial use. By analyzing the patterns or changes in land use, we can better predict the ever-changing transportation needs. The Tropic Zoning map follows in the appendix.

2.2. Environmental

In Utah there are a variety of local environmental issues. Each of the cities and counties needs to look at the environmental issues in their areas on a case-by-case basis. There are many resources that can help local entities to determine what issues need to be addressed and how problems that may exist can be resolved.

Some of the environmental concerns around the State are wetlands, endangered species, archeological sites, and geological sites among other issues. Environmental concerns should be addressed when looking at an area for any type of improvement to the transportation system. Protecting the

environment is a critical part of the transportation planning process.

Tropic lies in the center of the High Plateau Section of the Colorado Plateau Province. Part of the section, the Wasatch Formation, started forming 60 million years ago when large shallow lakes covered much of central and southwestern Utah. The lakes were probably void of most life forms. Deposition occurred for approximately 25 million years and the formation is 500 to 2,000 feet thick.

Approximately 35 million years ago, the High Plateau Section was uplifted by extensive volcanic activity and remnants of this activity can be seen in the nearby Black and Boulder Mountains. About 15 million years ago, the entire Colorado Plateau was elevated, which resulted in massive faulting on the western edge of the High Plateau Section. This section was broken along faults into large blocks or plateaus that include the nearby Markagunt, Paunsaugunt, Sevier and Aquarius Plateaus.

Compared to most areas of Garfield County, Tropic is relatively mild. The last frost usually occurs in the latter part of April and begins freezing in Mid-October. Tropic receives 12.30 inches of precipitation each year.

Drainage and branches related to the Paria River are a point of environmental concern.

Currently no known sites or wildlife issues were noted by Town officials.

Some areas of Tropic have a high water table, particularly during the early spring. Complications associated with this include seepage into basements and crop failure in some areas. (Information from Tropic Town's General Plan.)

The Federal Government owns much of the land surrounding Tropic in the form of Bryce Canyon National Park and Escalante Grand Staircase National Monument. These lands are considered beautiful and unique worldwide and this area draws people from around the country and many international tourists as well. The lands within and surrounding the Town of Tropic should be considered a fragile resource and care should be exercised in planning for this region.

2.3. **Socio-Economic** (Information from Census Brief, May 2001)

Historical growth rates have been identified for this study, because past growth is usually a good indicator of what might occur in the future. Chart 2-1 identifies the population growth over the past 50 years for Tropic and Garfield County. Chart 2-2 identifies that population change in Tropic has ranged from negative 20% between 1950 and 1960 to a positive 35% between 1990 and 2000.

Chart 2-3 identifies yearly population growth rates for the State of Utah and Garfield County.

As Garfield County population has generally declined and only grown in the most recent decade since 1950, Tropic's population has followed that same pattern and increased in population only since 1990.

Tropic has some unique demographic characteristics when compared with the State. Tropic has a slightly older population than the rest of the state. The State's median age is 27.1 years and Tropic's median age is 32.2 years.

The 1999 median household income in Tropic was \$42,500, very similar to the State median household income of \$45,773.

Chart 2-4 identifies the employment growth rate for Garfield County.

The unemployment rate in Garfield County in 2005 was 7.2%, significantly higher than other areas in the state. This may be because Garfield County depends more on tourism and recreation for employment than any other county in the state. With Bryce Canyon and Lake Powell, the county attracts many, many visitors each year. Garfield County exhibits one of the highest unemployment rates in the state due to the seasonal nature of the tourist economy. (Utah Department of Workforce Services July, 2006).

The largest employers in the county are:
 Ruby's Inn, Garfield School District, South
 Central Utah Telephone, Garfield Memorial
 Hospital, Federal Government, State of
 Utah, Xanterra Parks and Resorts, Inc.,

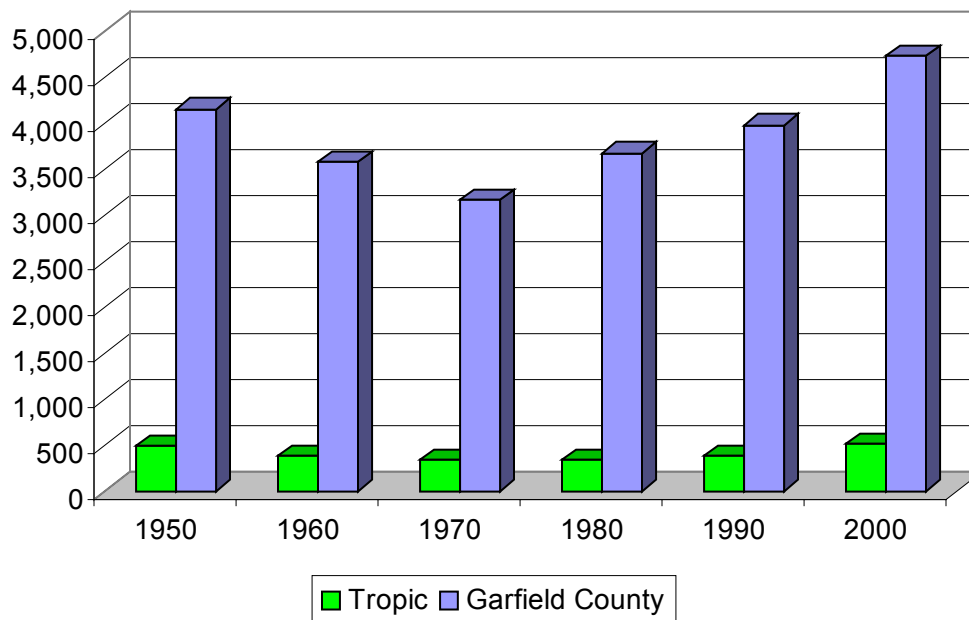
Skyline Forest Resources Inc, Turn About
 Ranch and Bryce Canyon Resort.

Chart 2-5 identifies the various employment
 sectors in Garfield County.

Chart 2-1 Population

Year	State of Utah	Southwest MCD	Garfield County	Tropic
1950	695,900	30,700	4,151	483
1960	900,000	31,800	3,577	382
1970	1,066,000	35,650	3,157	329
1980	1,474,000	56,050	3,673	338
1990	1,729,227	83,800	3,980	374
2000	2,246,553	142,006	4,735	508

Population

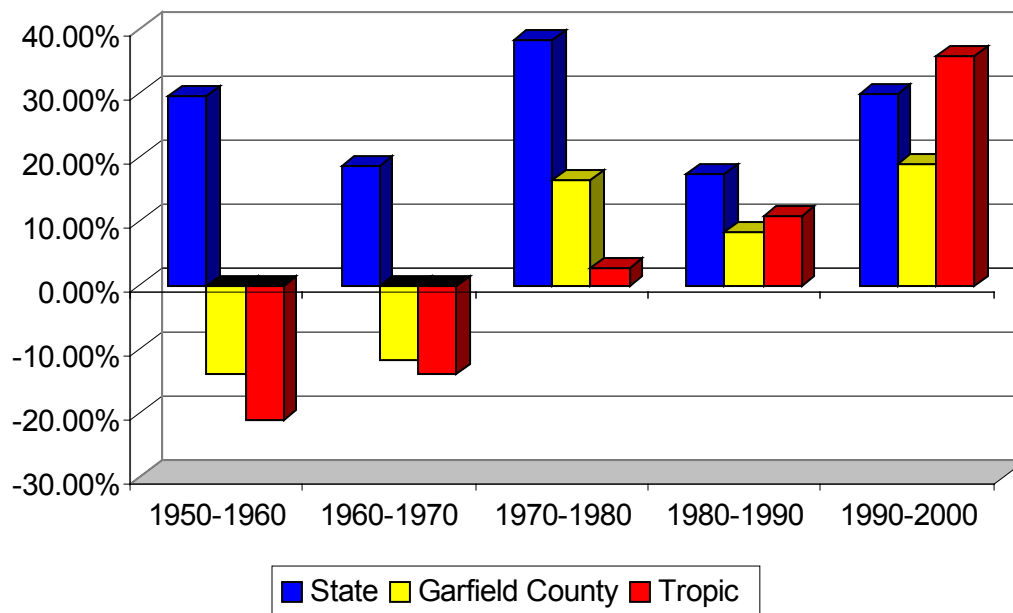


Source: U.S. Bureau of the Census
 Governor's Office of Planning and Budget
<http://www.governor.utah.gov/dea>

Chart 2-2. Population Change

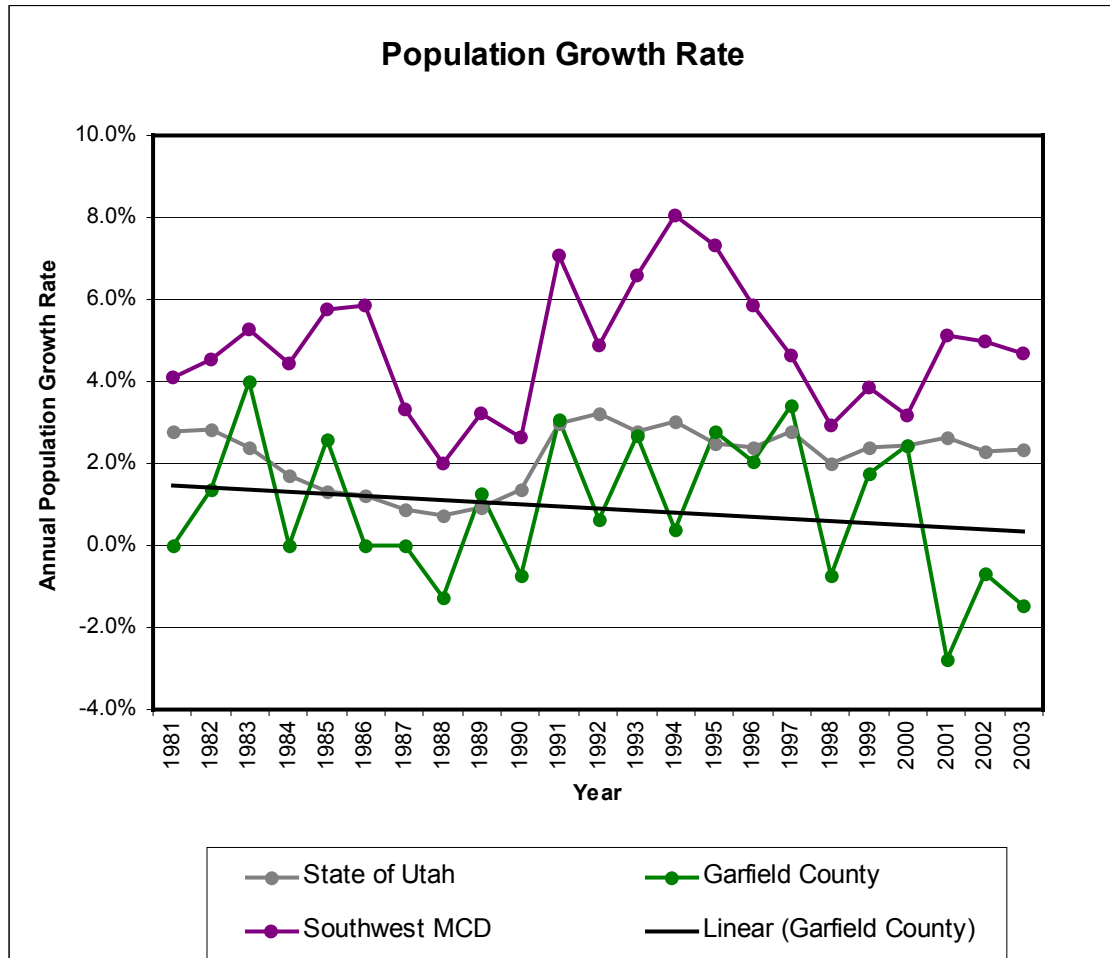
	State	Southwest MCD	Garfield County	Tropic
1950-1960	29.33%	3.58%	-13.83%	-20.91%
1960-1970	18.44%	12.11%	-11.74%	-13.87%
1970-1980	38.27%	57.22%	16.34%	2.74%
1980-1990	17.32%	49.51%	8.36%	10.65%
1990-2000	29.92%	69.46%	18.97%	35.83%

Decennial Population Change



Source: U.S. Bureau of the Census
 Governor's Office of Planning and Budget
<http://www.governor.utah.gov/dea>

Chart 2-3. Population Growth Rate (1980-2000)

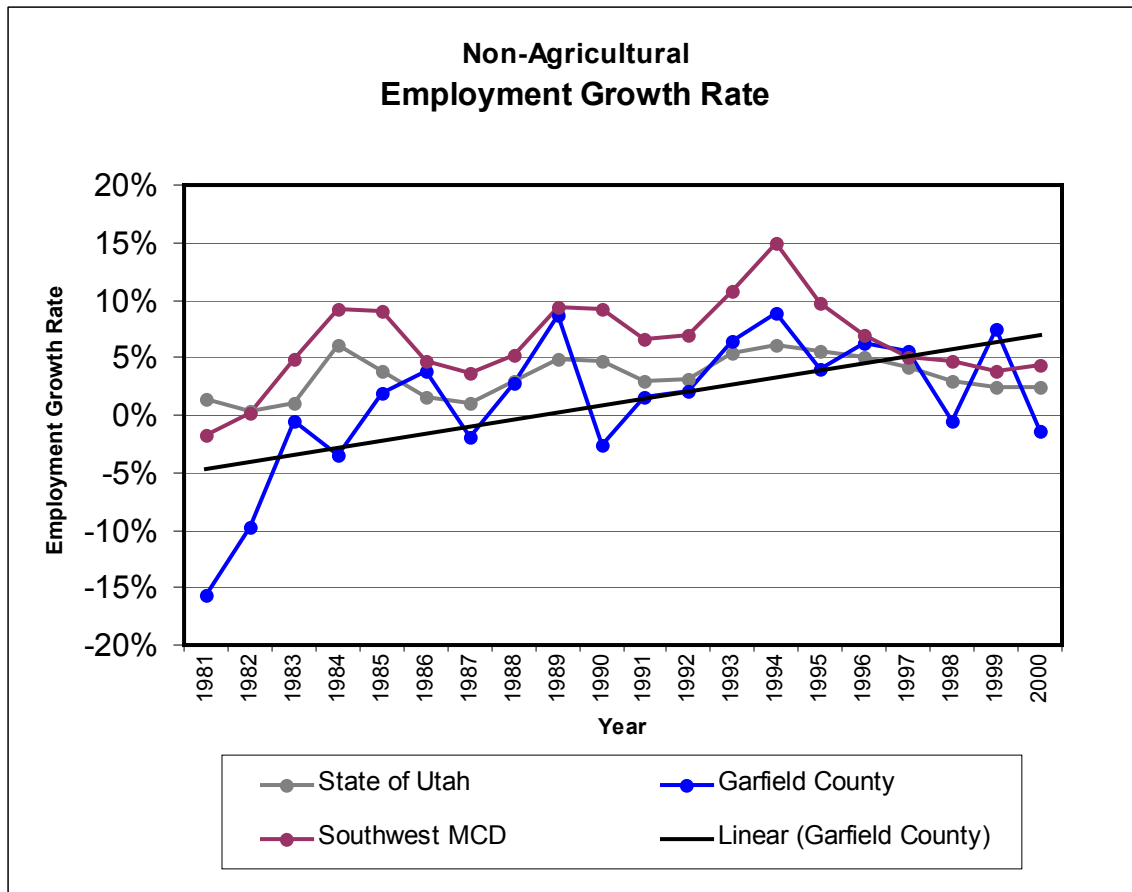


MCD = Multi-County District

Southwest MCD = Washington, Kane, Iron, Garfield and Beaver Counties

Source: Governors Office of Planning and Budget
<http://www.governor.utah.gov/dea>

Chart 2-4. Employment Growth Rate (1980-2000)



MCD = Multi-County District

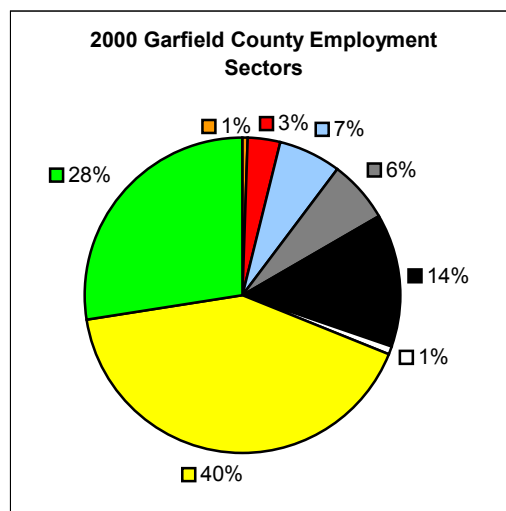
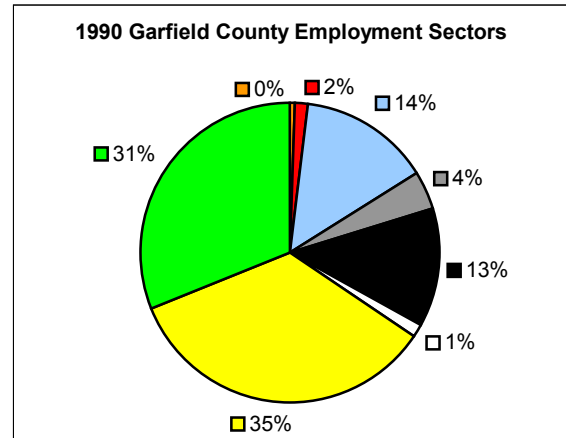
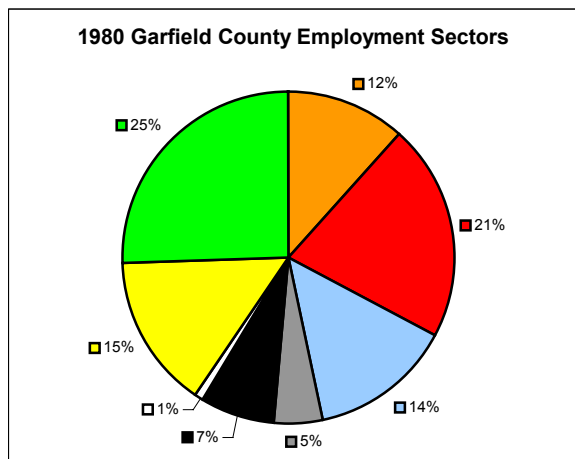
Southwest MCD = Washington, Kane, Iron, Garfield and Beaver Counties

Source: Governors Office of Planning and Budget
<http://www.governor.utah.gov/dea>

Chart 2-5. Employment Occupation Sectors (1980-2000)

	Sector	1980	1990	2000	Δ% 1980-2000
	Construction	11.7%	0.5%	0.6%	-95.28%
	FIRE	21.2%	1.6%	3.2%	-84.82%
	Government	13.8%	14.2%	6.5%	-52.69%
	Manufacturing	4.7%	4.0%	6.3%	34.02%
	Mining	7.2%	12.8%	13.6%	89.02%
	Services	0.9%	1.5%	0.9%	2.17%
	TCPU	14.9%	34.3%	41.2%	176.79%
	Trade	25.6%	31.1%	27.6%	7.94%

FIRE = Finance, Insurance & Real Estate
TCPU = Telecommunications & Public Utilities



Source: Governors Office of Planning and Budget
<http://www.governor.utah.gov/dea>

2.4. Functional Street Classification

This document identifies the current functional characteristics of the federal aid roadway network of Tropic. Functional street classification is a subjective means to identify how a roadway functions when a combination of the roadway's characteristics are evaluated. These characteristics include; roadway configuration, right-of-way, traffic volume, carrying capacity, property access, speed limit, roadway spacing, and length of trips using the roadway.

The primary functional classifications used in categorizing federal aid roadways of Tropic are: State Route, Collectors, and Local.

An Arterial's function is to provide traffic mobility at higher speeds with limited property access. Traffic from the local roads is gathered by the Collector system, which provides a balance between mobility and property access trips. Local streets and roads serve property access based trips and these trips are generally shorter in length. Please refer to Figure 2-1 to see the functional class of streets in Tropic.

The Tropic area is accessed by State Route 12 which bisects the town north to south. SR-12 extends northward toward Panguitch and loops down and around through Escalante up through Boulder and connects with SR – 24 in Wayne County.

The current functionally classified system generally defines the higher traffic roads, so only minor additions or changes will be required.

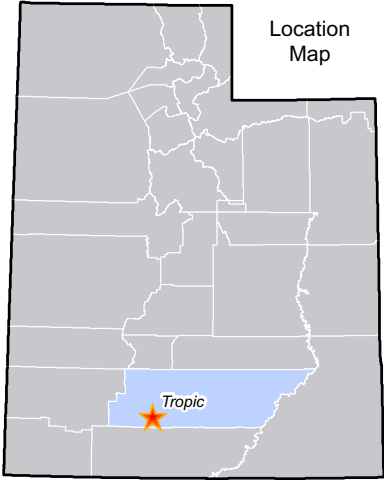
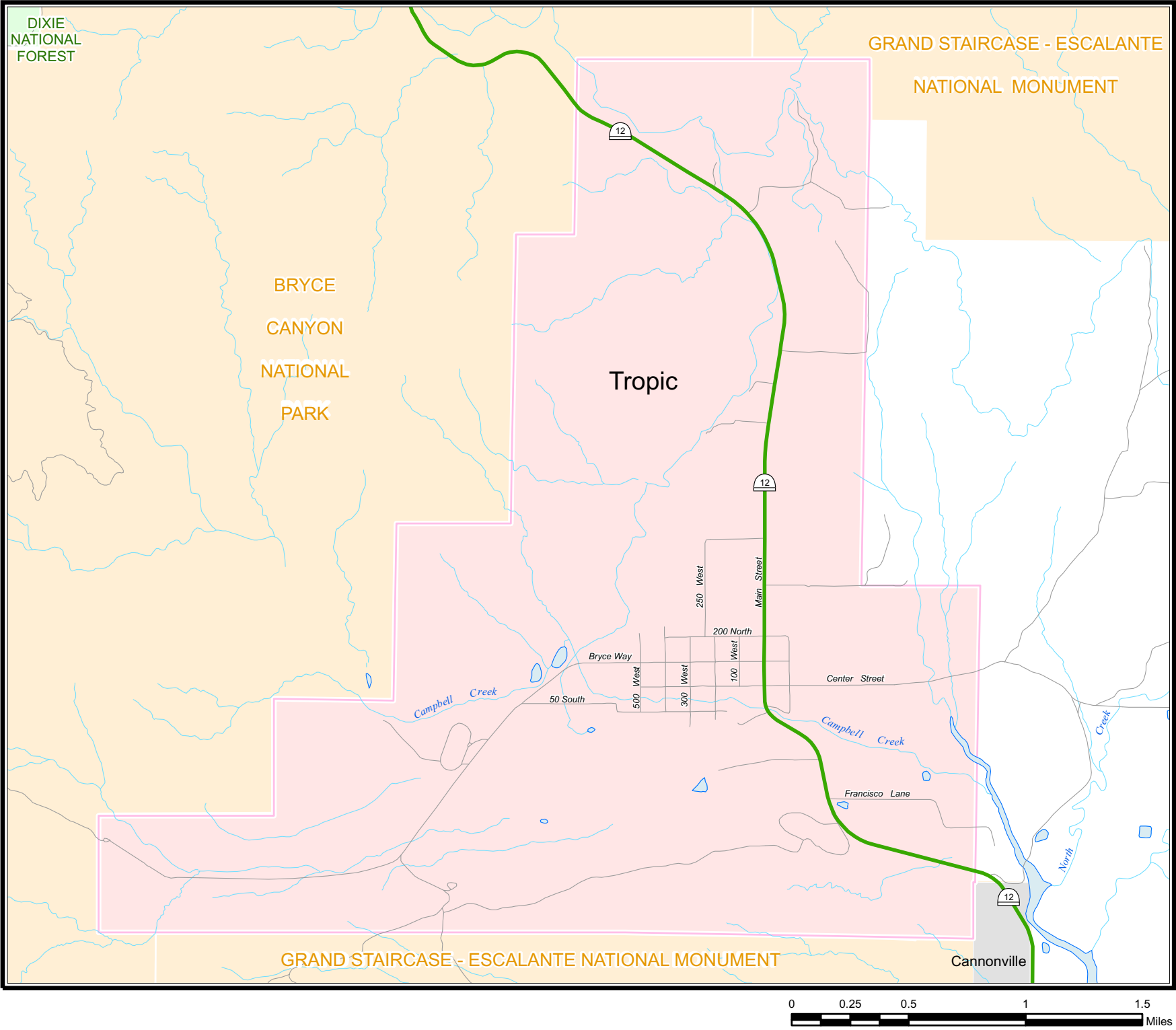


2.5. Bridges

There are (3) bridges on the state system located in the study area that could be eligible for federal bridge maintenance, rehabilitation, or replacement funds. Bridges are maintained and minor repairs made with maintenance funds. A bridge is rehabilitated or replaced as it deteriorates over time and as traffic volumes increase. Sufficiency rating indicates current condition of the structure with a rating of 100 showing a structure that is in excellent shape. A rating nearing 50 will reveal a structure that is in need of attention and is eligible for federal funding. Table 2-1 Summarizes the bridge structures in and around the study area.

Table 2-1 – Bridge Sufficiency Ratings

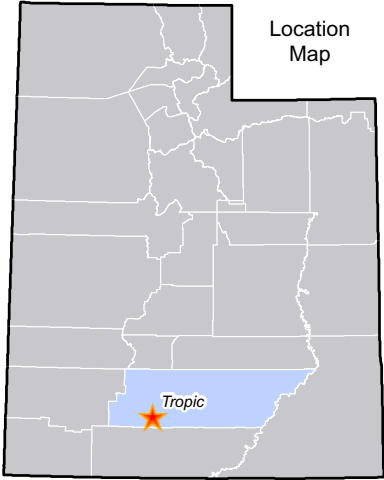
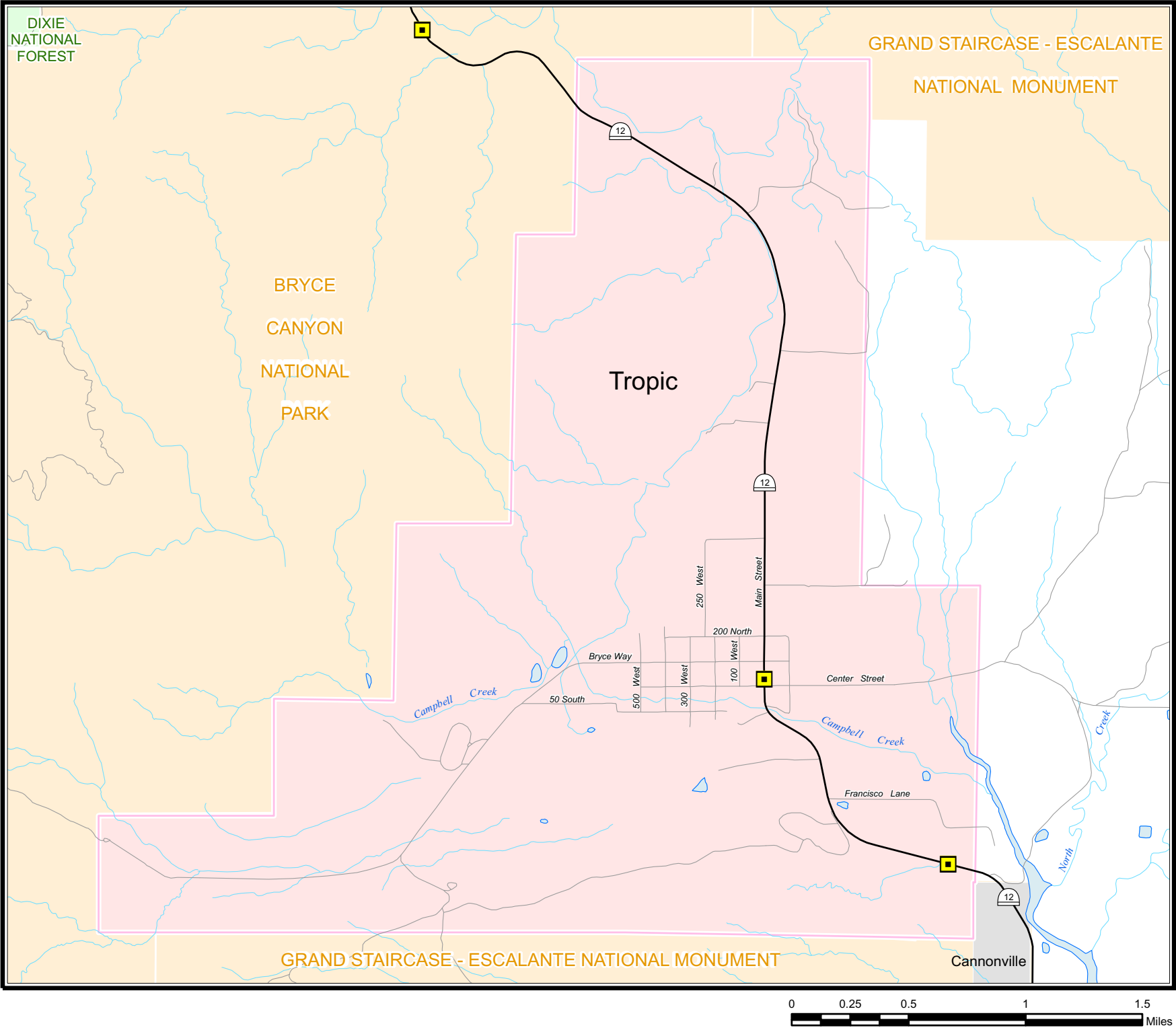
Bridge Number	Rte	Location	Bridge Rating
OD 245	12	E. Tropic Junction (Mossy Springs)	76
OV1419	12	South Tropic (Center Street)	78
OE1124	12	0.8 Miles Southeast of Tropic	69.5



Functional Class

- | | |
|--------------------------|-----------------|
| Interstate | Collector |
| Freeway Expressway | Minor Collector |
| Other Principal Arterial | Local |
| Minor Arterial | Other Roads |

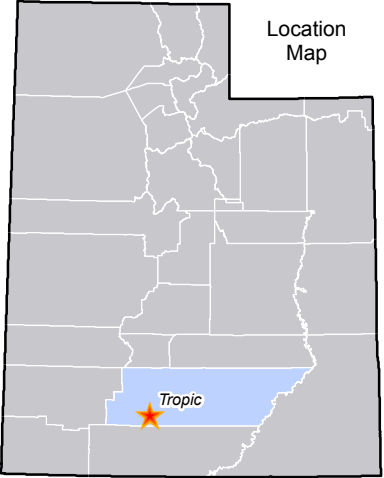
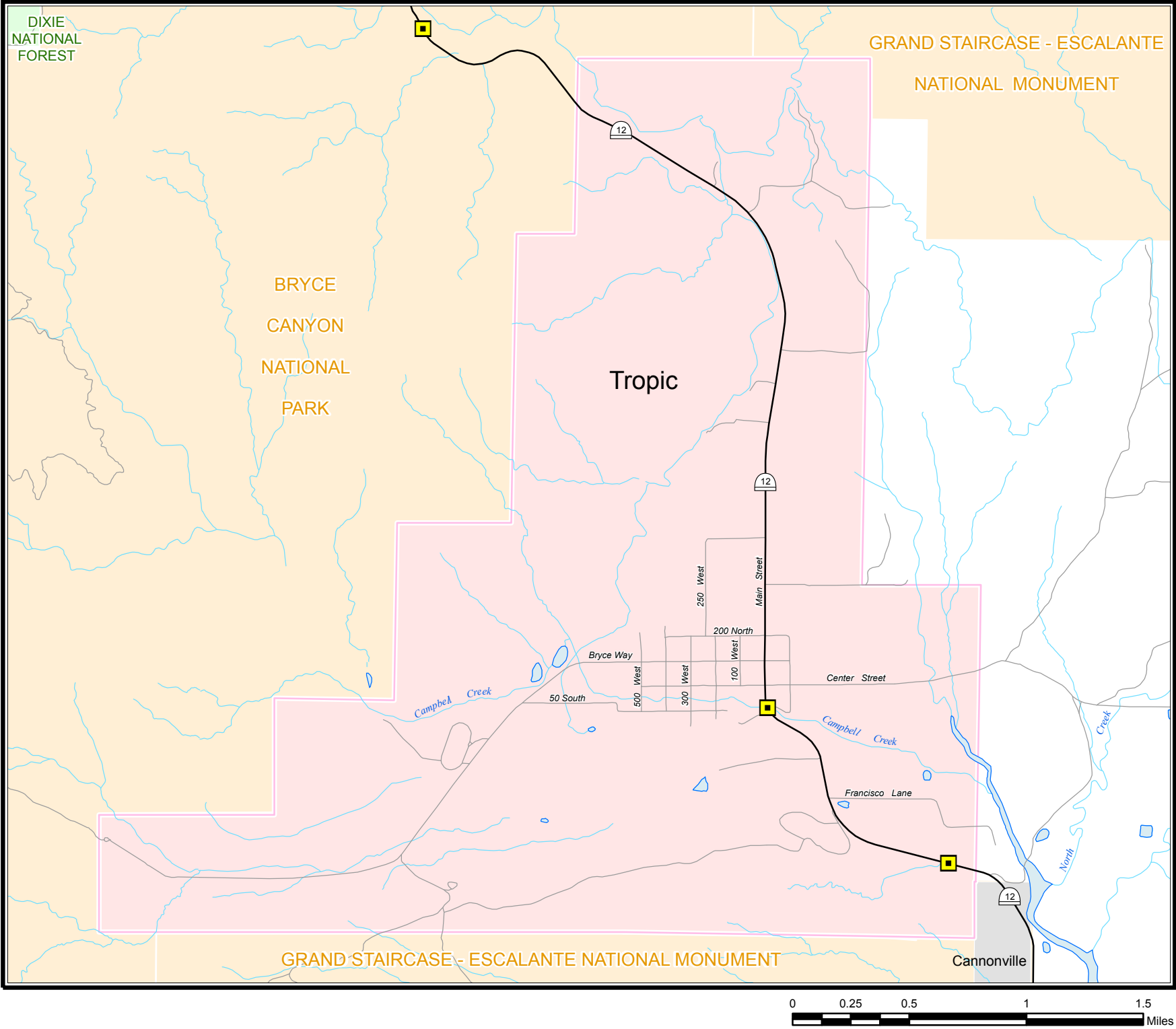
Figure 2-1
Functional Classification Map



Bridges Funding

- | | |
|-----------------------------------|-------------|
| Eligible for Replacement Funds | State Roads |
| Eligible for Rehabilitation Funds | Other Roads |
| Maintenance Funds Only | Streams |

Figure 2-2
Bridge Sufficiency Map



Bridges Funding

- | | |
|-----------------------------------|-------------|
| Eligible for Replacement Funds | State Roads |
| Eligible for Rehabilitation Funds | Other Roads |
| Maintenance Funds Only | Streams |

Figure 2-2
Bridge Sufficiency Map

2.6. Traffic Counts

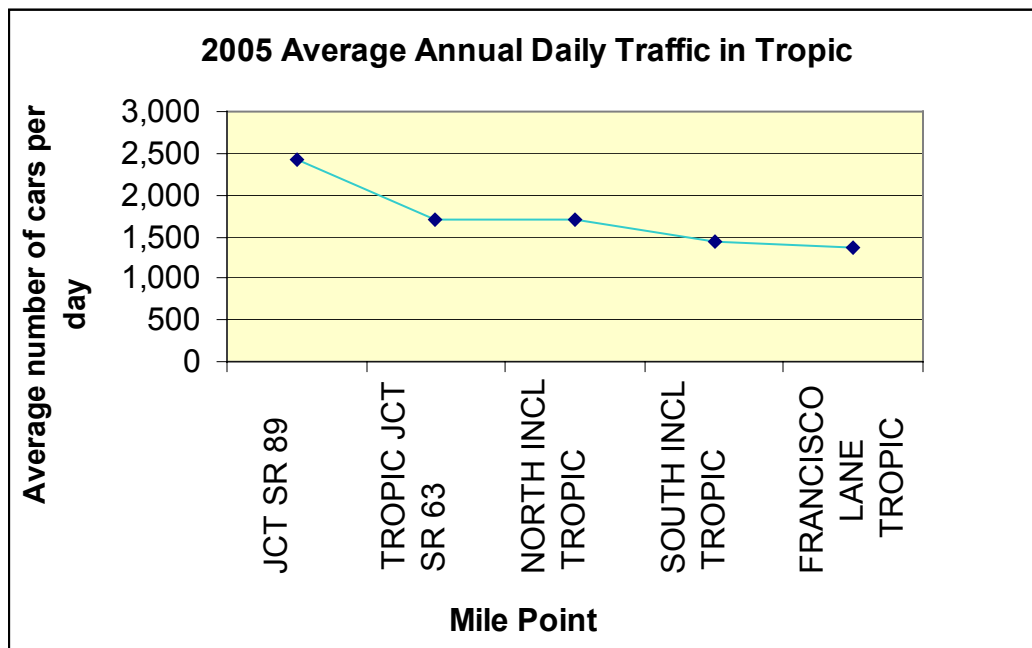
Recent average daily traffic count data were obtained from UDOT. Table 2-2 shows the traffic count data on the key state roadways of the study area. The number of vehicles in both directions that pass over a given segment of roadway in a 24-hour period is referred to as the average daily traffic (ADT) for that segment.

A map illustrating existing and future traffic, peak season traffic, and roadway capacities is presented in the Traffic Forecast section 3.2.

Table 2-2

Tropic's Average Annual Daily Traffic 2000 - 2005									
Route	BMP	EMP	Description	2000	2001	2002	2003	2004	2005
0012	0.00	13.64	JCT SR 89	2,360	2,450	2,510	2,465	2,420	2,430
0012	13.64	20.84	TROPIC JCT SR 63	2,330	2,370	2,425	1,720	1,690	1,695
0012	20.84	21.37	NORTH INCL TROPIC	1,620	1,645	1,685	1,179	1,710	1,715
0012	21.37	21.76	SOUTH INCL TROPIC	1,323	1,580	1,620	1,590	1,725	1,430
0012	21.76	25.55	FRANCISCO LANE TROPIC	1,323	1,580	1,620	1,590	1,560	1,360

Chart 2-6



2005 Traffic on Utah Highways
UDOT Systems Planning and Programming

2.7. Traffic Accidents

Traffic accident data was obtained from UDOT's database of reported accidents from 2004. Table 2-3 summarizes the accident statistics for those segments for the year 2004. Additional information includes the average daily traffic, the number of reported accidents, and the accident rates. The roadway segment accident rates were determined in terms of accidents per million vehicle miles traveled. The crash rates for each roadway segment are compared to the expected crash rate for similar facilities across the state.

Upon review of the accident data for the state system in the area, there appears to

be lower than expected accident rates along SR-12.

Figure 2-3 shows the safety index, which incorporates crash data taken from 2002-2004 for each of the various segments of the state highway system in the study area.

The safety index is a composite of number of accidents, daily traffic, and the severity for each state highway segment.

The Table below shows that there was a lower than expected number of accidents on along SR-12 through Tropic.

Tropic may wish to review the accident history for the local street system to identify any specific accident hot spot locations.

Table 2-3. Crash Data 2004

Road	From Milepost	End Milepost	AADT (2005)	# Crashes (2005)	Crash Rate	
					Actual	Expected*
12	13.60	18.18	2,371	3	0.76	1.96
12	18.19	21.68	2,214	3	1.06	1.96
12	21.69	22.38	1,580	2	5.03	1.96
12	22.39	25.56	1,580	3	1.64	1.96
12	25.57	25.73	1,461	0	0.00	1.96

* One Fatal accident

Statewide average accident rates for functional class and volume group. Accident rates are per million vehicle miles traveled

Red indicates higher than expected rates of accidents

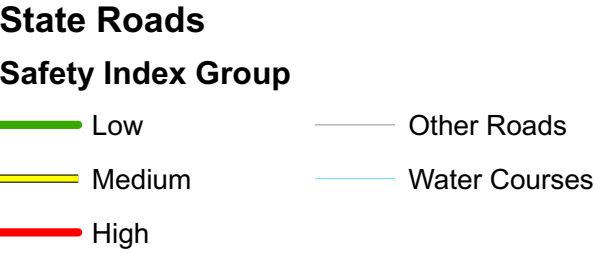
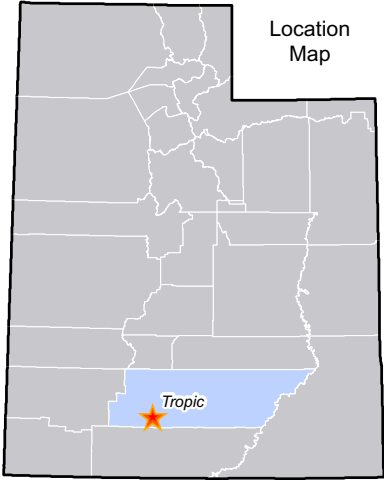
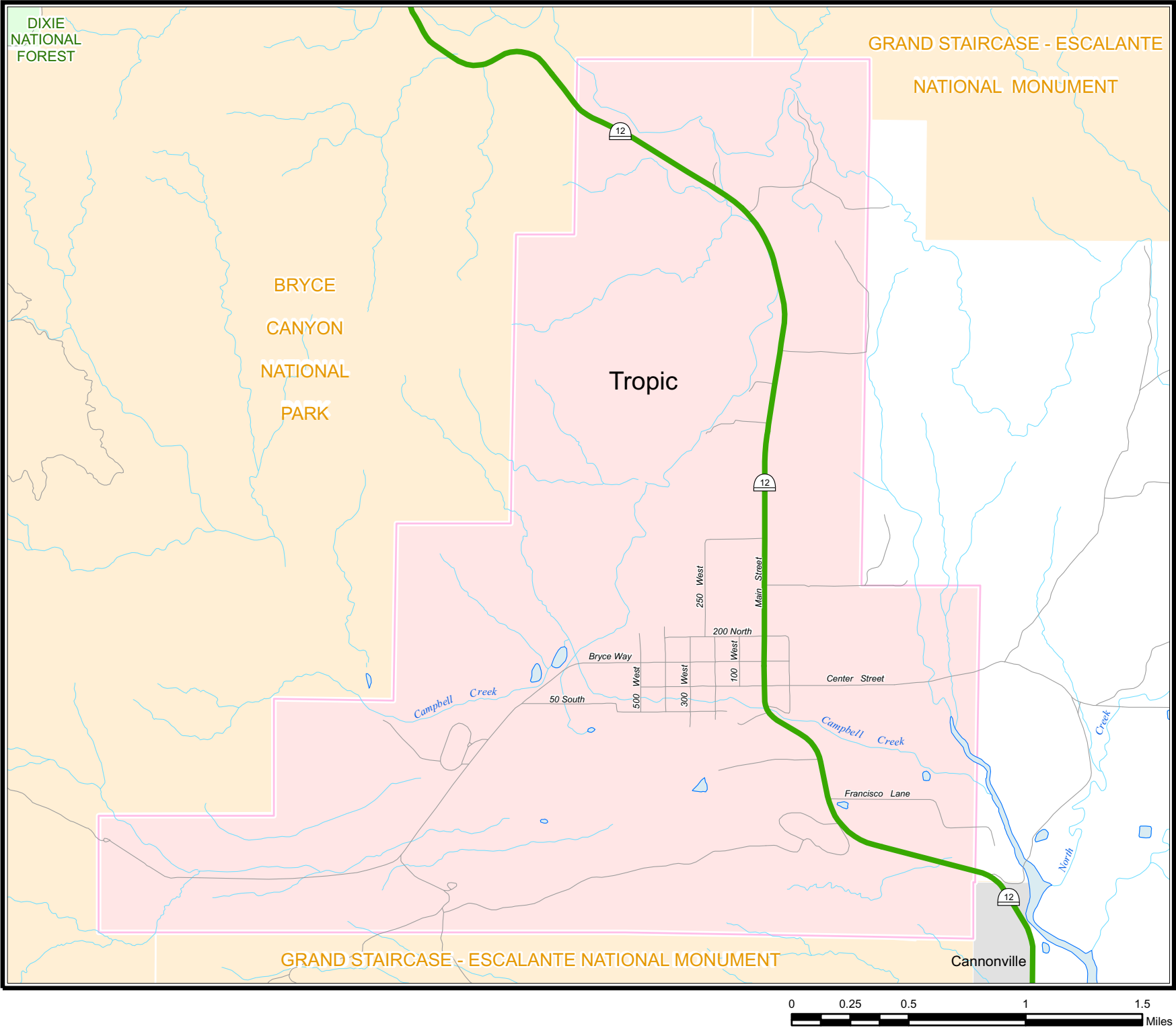


Figure 2-3
State Road Safety Index

2.8. Bicycle and Pedestrian

The Federal Highway Administration recognizes the increasingly important role of bicycling and walking in creating a balanced, intermodal transportation system, and encourages state and local governments to incorporate all necessary provisions to accommodate bicycle and pedestrian traffic. In following this directive, the Town of Tropic is encouraged to adopt a “complete streets” philosophy that allows for the advancement of a transportation system for both motorized and non-motorized travel. Please refer to www.completestreets.org for more information.

2.8.1. Biking/Trails

The Town of Tropic is located in one of the most scenic areas of the State and functions as the gateway to many of the parks in the area. Located just east of Bryce Canyon National Park, Tropic serves as a trailhead for trails from the Park to west of town. Tropic is a major lodging venue for Bryce Canyon National Park, Grand Staircase National Monument, and Kodachrome State Park during the tourist season, which includes bicycle tourists as well.

State Route 12, proclaimed as the All American Road in 2002 by the National Scenic Byway program, and also selected as one of the top ten highways in America by Car and Driver Magazine, serves as Tropic’s main street. The route provides an abundance of spectacular scenery, but also includes

substantial changes in grade and many curves that impact bicycle travel. The Town of Tropic does not currently have designated bike lanes and there is limited roadway shoulder on the outskirts of town, although shoulder conditions improve in the downtown section.



The Red Canyon Bike Path runs along SR-12, providing an alternative route for bicyclists and other users. The 5.4 miles of built trail is a part of the overall vision to provide a bike path from the Jct. of US-89 to Bryce Canyon National Park. Dependent on funding, the Forest Service is planning to construct subsequent phases of the Red Canyon Bike Path.

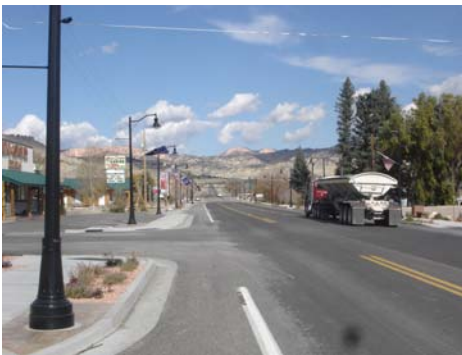
As is the case in most rural locations, there are a number of off-highway-vehicles in use in Tropic. Both residents and visitors enjoy riding ATV’s, as is evidenced by the tours which can be scheduled at Bryce Canyon National Park.

2.8.2. Pedestrians

Walking is a part of every trip and the Town of Tropic recognizes the need to create safer conditions. The Town received Transportation Enhancement funds to design and construct a landscape, beautification project that included placement of sidewalk through three blocks in the downtown area. Specifically noted in the application was the desire to provide adequate infrastructure and increase the number of pedestrians using SR-12 to access activities.

2.9. Public Transportation

There is no public transportation serving Tropic. The nearest Amtrak intercity rail passenger service is in Green River, Provo, or Salt Lake City, Utah. Greyhound intercity bus service is provided along the I-15 corridor west of the Wasatch Plateau. Scheduled airline service is provided at Cedar City, St. George and Salt Lake City, with limited airline service soon to come to the nearby Bryce Canyon Airport.

**2.10. Freight**

Aside from local retail deliveries and construction activities, relatively little freight passing through Tropic on State Route 12.

Almost no interstate long distance trucking uses this twisting and slow route through the scenic wonders of southern Utah.

2.11. Aviation Facilities & Operations

The Bryce Canyon Airport serves Tropic, and is located west of town along SR 12. Bryce Canyon Airport is equipped with a single, asphalt-paved runway, #03-21 that is 7400 ft in length and 75 ft wide. Runway 03-21 has a paved parallel taxiway, is fully lighted, and is equipped with Precision Approach Path Indicator (PAPI) lights.

Bryce Canyon Airport is also equipped with a VOR omni-directional radio beacon for aircraft navigation; AWOS automated weather information for pilots, and has an airway beacon light, which is on from dusk to dawn. As the gateway for Bryce Canyon National Park and other attractions in the area, future plans for the Bryce Canyon Airport include a non-precision approach system, and "139 Certification" which will allow scheduled airline service into the field. Currently Scenic Airlines of Las Vegas, Nevada is operating charter flights from that city to Bryce Canyon Airport using 18-passenger DeHaviland "Twin Otter"

turboprop commuter-type airliners. Scenic Airline plans to begin scheduled airline service from Las Vegas to Bryce Canyon once the airport is certified to accept such flights.

2.12. Revenue

Maintenance of existing transportation facilities and construction of new facilities come primarily from revenue sources that include the Town of Tropic general fund, Federal funds and State Class B and C funds.

Financing for local transportation projects consists of a combination of federal, state, and local revenues. However, this total is not entirely available for transportation improvement projects, since annual operating and maintenance costs must be deducted from the total revenue. In addition, the City is limited in their ability to subsidize the transportation budget from general fund revenues.

2.12.1. State Class B and C Program

The distribution of Class B and C Road Fund Program monies is established by state legislation and is administered by the State Department of Transportation. Revenues for the program are derived from State fuel taxes, registration fees, driver license fees, inspection fees, and transportation permits. Twenty-five percent of the funds derived from the taxes and fees are distributed to cities and counties for construction and maintenance programs.

Class B and C funds are allocated to each City and county by the following formula: 50% based on the population ratio of the local jurisdiction with the population of the State, 50% based on the ratio that the Class B roads weighted mileage within each county and the class C roads weighted mileage within each municipality bear to the total class B and Class C roads weighted mileage within the state. Weighted means the sum of the following: (i) paved roads multiplied by five; (ii) graveled road miles multiplied by two; and (iii) all other road types multiplied by one. (Utah Code 72-2-108) For more information go to UDOT's homepage @ www.udot.utah.gov, tab on "Doing Business" select the tab for "Local Government Assistance" here you will find the Regulations governing Class B&C funds. The table below identifies the ratio used to determine the amount of B and C funds allocated.

Class B and C funds can be used for maintenance and construction of highways, however thirty percent of the funds must be used for construction or maintenance projects that exceed \$40,000. Class B and C funds can also be used for matching federal funds or to pay the principal, interest, premiums, and reserves issued toward transportation bonds.

Tropic received \$31,685.95 in fiscal year 2005 for its Class C fund allocation.

2.12.2 Federal Funds

There are federal monies that are available to cities and counties through federal-aid programs. The funds are administered by the Utah Department of Transportation. In order to be eligible, a project must be listed on the five-year Statewide Transportation Improvement Program (STIP).

The Surface Transportation Program (STP) provides funding for any road that is functionally classified as a collector street or higher. STP funds can be used for a range of projects including rehabilitation and new construction. The Joint Highway Committee programs a portion of the STP funds for projects around the State. A portion of the STP funds can be used in any area of the State, in concurrence with the State Transportation Commission.

Transportation Enhancement funds are allocated based on a competitive application process. The Transportation Enhancement Advisory Committee reviews the applications and then a portion of those are recommended to the State Transportation Commission for funding. Transportation enhancements include 12 categories ranging from historic preservation, to bicycle and pedestrian facilities, to water runoff mitigation. Other funds that are available are State Trails Funds, administered by the Division of Wildlife Resources.

Apportionment Method of Class B and C Funds

Based on	Of
50%	Roadway Mileage *Based on Surface Type Classification (Weighted Measure) Paved Road (X 5) Graveled Road (X 2) Other Road (X 1)
50%	Total Population

The amount of money available for projects specifically in the study area varies each year depending on the planned projects in UDOT's Region Four. As a result, federal aid program monies are not listed as part of the study area's transportation revenue.



2.12.3 Local Funds

Tropic, like most towns, has utilized general fund revenues in its transportation program. Other options available to improve the Town's transportation facilities could involve some type of bonding arrangement, either through the creation of a redevelopment district or a special improvement district. These districts are organized for the purpose of funding a single, specific project that benefits an

identifiable group of properties. Another source of funding is through general obligation bonding arrangements for projects felt to be beneficial to the entire entity issuing the bonds.



2.12.4 Private Sources

Private interests often provide alternative funding for transportation improvements. Developers construct the local streets within the subdivisions and often dedicate right-of-way and participate in the construction of collector or arterial streets adjacent to their developments. Developers should be considered as an alternative source of funds for projects because of the impacts of the development, such as the need for traffic signals or street widening. Developers should be expected to mitigate certain impacts resulting from their developments. The need for improvements, such as traffic signals or street widening can be mitigated through direct construction or impact fees.

3. Future Conditions

3.1. Land Use and Growth

Tropic's Community Transportation Plan must be responsive to current and future needs of the area. The area's growth must be estimated and incorporated into the evaluation and analysis of future transportation needs. This is done by:

- Forecasting future population, employment, and land use;
- Projecting future traffic demand;
- Forecasting roadway travel volumes;
- Evaluating transportation system impacts;
- Documenting transportation system needs; and
- Identifying improvements to meet those needs.

This chapter summarizes the population, employment, and land use projections developed for the project study area. Future traffic volumes for the major roadway segments are based on projections utilizing 20 years of traffic count history. The forecasted traffic data are then used to identify future deficiencies in the transportation system.

3.1.1. Population and Employment Forecasts

The Governor's Office of Planning and Budget develop population and employment projections. The current population and employment levels, as well as the future

projections for each are shown for Tropic and Garfield County in the following table.

Table 3-1 Current and Future Population and Employment

Year	Tropic	Garfield County	
	Population	Population	Employment
2005	506	4,869	3,351
2030	781	6,841	4,992

3.1.2 Future Land Use

Some areas for expanding on future development were discussed during the course of the Community Transportation Plan. Updated Land Use documents can be found in the Tropic General Plan. It is reasonable to expect that future development will mostly consist of residential development and some limited commercial.

While specific development plans change with time, it is important to note possible areas of development within the Tropic area. Commercial and industrial growth is also important in understanding transportation needs.

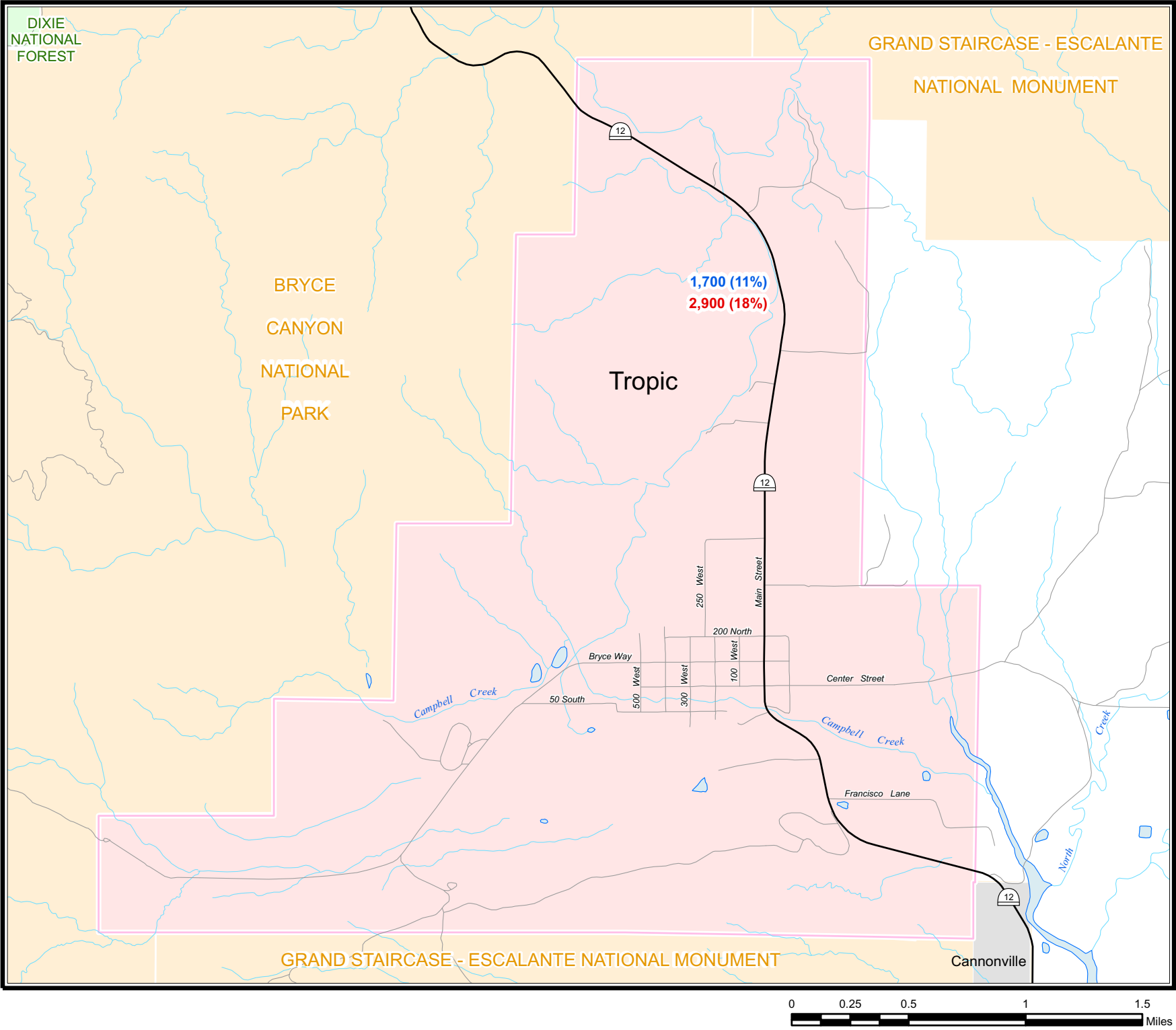


3.2. Traffic Forecast

Traffic in the Tropic area is growing slightly and will probably continue to gradually grow. The Utah Department of Transportation routinely conducts vehicle traffic counts on its facilities. Traffic on State Route 12 has historically grown at about 2.4% per year for the period from 1985 to 2004. It is expected that local street traffic has increased at a similar rate or less.



Figure 3-1 shows the average annual daily traffic, on State Route 12, for the existing condition year 2004 and the forecast year 2030. Also shown is the percentage of the roadway capacity achieved utilizing the volumes above. The map illustrates that the corridor should not have capacity issues, by the year 2030, given continuance with the observed historical growth trend.



Tropic City Transportation Master Plan
Average Annual Daily Traffic
Year 2004 (% of Roadway Capacity)
Year 2030 (% of Roadway Capacity)

- State Roads
- Other Roads
- Streams

Figure 3-1
Average Annual Daily Traffic

4. Transportation Improvement Projects

4.1. Current State Transportation Improvement Program (2006-2010 STIP)

At the present time there are no state route sponsored STIP or Long Range Plan projects in the Tropic area. Regularly scheduled highway maintenance activities will continue as expected.

4.2. Recommended Projects

The following list identifies the six projects that have been identified as having the highest priority scored by the Tropic Transportation Advisory Committee, as identified by this study. These needs/issues were identified through a series of two meetings where the TAC identified the needs and set priorities for projects.

- City-wide Drainage Study
- Add sidewalk along Bryce Way
- Double chip seal on dirt roads
- Develop city-wide standards for:
 - Road width
 - Street cross-sections
 - Requirements for development
 - Access spacing standards
- Pave Bryce Way to cattle guard
- Extend passing lane north of town

Additionally, many concerns, issues and potential projects were identified which are found on the attached community issues list at the end of this chapter (Table 4.1).



4.3. Revenue Summary

4.3.1. Federal and State Participation

Federal and State participation is important for the success of implementing these projects. UDOT needs to see the Community Transportation Plan so that they understand what the Town wants to do with its transportation system. UDOT can then weigh the priorities of the city against the rest of the state. It is important for Tropic to promote projects that can be placed on UDOT's five-year Statewide Transportation Improvement Program (STIP) as soon as possible. The process for placing projects into the STIP and funding of these projects can be found at UDOT's homepage @ www.udot.utah.gov, tab on "Doing Business" select the tab for " Planning and Programming" here there is a subtopic

entitled “Statewide Transportation Improvement Program (STIP)” that describes this program in detail. Additionally coordination with UDOT’s Region Director and Engineer for Planning will be practical.

4.3.2. City Participation

The Town will fund the local Tropic projects. The local match component and partnering opportunities vary by the funding source.



4.4. Other Potential Funding

Previous sections of this chapter show significant shortfalls projected for the short-range and long-range programs. The following options may be available to help offset all or part of the anticipated shortfalls:

- Increased transportation impact fees.
- Increased general fund allocation to transportation projects.
- General obligation bonds repaid with property tax levies.
- Increased participation by developers, including cooperative programs and incentives.

- Special improvement districts (SIDs), whereby adjacent property owners are assessed portions of the project cost.
- Sales or other tax increase.
- State funding for improvements on the county roadway system.
- Increased gas tax, which would have to be approved by the State Legislature.
- Federal-aid available under one of the programs provided in the federal transportation bill (SAFETEA-LU is the current bill).

Increased general fund allocation means that General Funds must be diverted from other governmental services and/or programs. General obligation bonds provide initial capital for transportation improvement projects but add to the debt service of the governmental agency. One way to avoid increased taxes needed to retire the debt is to sell bonds repaid with a portion of the municipalities’ State Class monies for a certain number of years.

Participation by private developers provides a promising funding mechanism for new projects. Developers can contribute to transportation projects by constructing on-site improvements along their site frontage and by paying development fees.

Municipalities commonly require developers to dedicate right-of-way and widen streets along the site frontage. A negative side of the on-site improvements is that the streets

are improved in pieces. If there are not several developers adjacent to one another at the same time, a continuous improved road is not provided. One way to overcome this problem is for the jurisdiction to construct the street and charge the developers their share when they develop their property.

Another way developers can participate is through development fees. The fees would be based on the additional improvements required to accommodate the new development and would be proportioned among each development. The expenditure of additional funds provided by the fees would be subject to the City's spending limit. However, development fees are often a controversial issue and may or may not be an appropriate method of funding projects.

5. Planning Issues, Guidelines, and Other Data

Provided below is a discussion of various issues with a focus on elements that promote a safe and efficient transportation system in the future.

5.1. Guidelines and Policies

These guidelines address certain areas of concern that are applicable to the Tropic Community Transportation Plan.

5.1.1. Access Management

This section will define and describe some of the aspects of Access Management for roadways and why it is so important.

Access Management can make many of the roads in a system work better and operate more safely if properly implemented. There are many benefits to properly implemented access management. Some of the benefits follow:

- Reduction in traffic conflicts and reduction of crashes and/or severity of crashes
- Reduced traffic congestion
- Preservation of traffic capacity and level of service
- Improved economic benefits to area businesses and service agencies
- Potential reductions in air pollution from reduced vehicle idle

5.1.1.1. Definition

Access management is the process of comprehensive application of traffic

engineering techniques in a manner that seek to optimize highway system performance in terms of safety, capacity, and speed. Access Management is one tool of many that makes a traffic system work better with what is available.



5.1.1.2. Access Management Techniques

There are many techniques that can be used in access management. The most common techniques are signal spacing, street spacing, access spacing, and interchange to crossroad access spacing. There are various distances for each spacing, dependant upon the roadway functionality, roadway type being accessed and the accessing roadway. UDOT has developed a state highway access management program and more information can be gathered from the UDOT website and from the Access Management Program Coordinator.

5.1.1.3. Where to Use Access Management

Access Management can be used on any roadway. In some cases, such as State Highways, access management in Utah is

regulatory law. Access management can be used as an inexpensive way to improve performance on a major roadway that is increasing in volume. Access management should be used on new roadways and roadways that are to be improved so as to prolong the usefulness of the roadway.

5.1.2. Context Sensitive Solutions

Context Sensitive Solutions (CSS) addresses the need, purpose, safety and service of a transportation project, as well as the protection of scenic, aesthetic, historic, environmental and other community values. CSS is an approach to transportation solutions that find, recognize and incorporate issues/factors that are part of the larger context such as the physical, social, economic, political and cultural impacts. When this approach is used in a project the project become better for all of the entities involved.



5.1.3. Recommended Roadway Cross Sections

Cross sections are the combination of the individual design elements that constitute

the design of the roadway. Cross section elements include the pavement surface for driving and parking lanes, curb and gutter, sidewalks and additional buffer/landscape areas. Right-of-way is the total land area needed to provide for the cross section elements.

The design of the individual roadway elements depends on the intended use of the facility. Roads with higher design volumes and speeds may require more travel lanes and wider right-of-way than low volume, low speed roads. The high use roadway type should include wider shoulders and medians, separate turn lanes, dedicated bicycle lanes (where appropriate), elimination of on street parking, and control of street and driveway access. For most roadways, an additional buffer area is provided beyond the edge of pavement line. This buffer area may accommodate, curb and gutter, sidewalk, landscaping, and local utilities. Locating the utilities outside the traveled way minimizes traffic disruption in utility repairs or changes in service are needed.

Federal Highway standard widths apply on the all roads that are part of the state highway system. Also, all federally funded roadways in Tropic and Washington County must adhere to the same standards for widths and design. Examples of typical cross-sections can be seen at the end of this chapter.

5.2. Bicycles and Pedestrians

5.2.1. Bicycles/Trails

Bicycles are allowed on all state roadways, except where legally prohibited, and as such should be a consideration on all roads that are being designed and constructed and as roadway improvements are taking place.

There are a number of bicyclists that travel on SR-12 and adding bike lanes or widening shoulders would create safer traveling conditions. As referenced in Chapter 2 of this Plan, the Forest Service is planning to extend the Red Canyon Bike Path, which runs parallel to SR-12, into Bryce Canyon. This shared use path provides an alternative to bicyclists traveling on SR-12.

The level of interest in bicycling is expected to increase in Tropic, and as growth occurs developers should be encouraged to include shared use or separate bicycle/pedestrian pathways in new developments. Opportunities to increase shoulder-width in conjunction with a roadway project should be taken whenever technically, environmentally, and financially feasible.

In order to properly plan for future facilities, the Town may want to pursue development of a trails master plan. Such a plan would ensure that the trails system would provide for uninterrupted non-motorized travel, with origination and destination opportunities. As facilities are planned, designed and constructed, a review of the connectivity of the system is critical. With input from the community, connectivity of the trails should

play an integral role in the decision making process for potential projects. In order to enhance the quality of life in the community, the trails should be accessible to all users and incorporate ADA requirements, as appropriate.



The trails, when constructed, may have slight variances in application type due to differences in the terrain at a specific trail location or differing user needs. However, regardless of the design type, the applicable design standards found in the latest version of the AASHTO Guide for the Development of Bicycle Facilities should be followed, as well as the Manual on Uniform Traffic Control Devices (MUTCD) guidelines for appropriate signage of the trails system.

5.2.2 Pedestrians

Every effort should be made to accommodate pedestrians in Tropic. An opportunity to include accessible sidewalks, while adhering to ADA requirements, during construction of other projects is encouraged. When constructing a sidewalk, for the safety and convenience of pedestrian traffic, placement should be free from debris and obstructions or

impediments such as utility poles, trees, bushes, etc. The interconnection of the Town's sidewalk system should be considered as development takes place.

Sidewalks in residential areas should be at least 5-feet wide whenever adequate right-of-way can be secured. This will provide sufficient room and a level of comfort to persons walking in pairs or passing and will specifically allow for persons with strollers or in wheelchairs to pass. On major roadways, sidewalks at least 6-feet wide and with a 6 to 10-foot park strip are desirable. In pedestrian-focused areas, such as schools, parks, sports venues or theaters, and in hotel and market districts, even wider sidewalks are recommended to accommodate and encourage a higher level of pedestrian activity, especially where tourist use would be expected.

To ensure consistency of sidewalks throughout the area, UDOT's approved standard for sidewalks should be followed, as well as the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities.



There may be opportunity to improve the Tropic's sidewalk system through the Utah Department of Transportation's Safe Sidewalk Program, made available through the Traffic and Safety Division. The Town may contact UDOT's Cedar City District office for application requirements.

Schools in the area should be aware of the need to develop a routing plan. The routing plan is to be reviewed and updated annually. Information on the Safe Routes to School program is available by contacting the Utah Department of Transportation's Traffic and Safety Division.

5.3. Enhancement Program

In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) created the Transportation Enhancement program. The program has since been reauthorized in subsequent bills (i.e. TEA-21). The Transportation Enhancement program provides opportunities to use federal dollars to enhance the cultural and environmental value of the transportation system. These transportation enhancements are defined as follows by SAFETEA-LU:

The term 'transportation enhancement activities' means, with respect to any project or the area to be served by the project, any of the following activities if such activity relates to surface transportation: provision of facilities for pedestrians and bicycles, provision of safety and educational activities

for pedestrians and bicyclists, acquisition of scenic easements and scenic or historic sites, scenic or historic highway programs (including the provision of tourist and welcome center facilities), landscaping and other scenic beautification, historic preservation, rehabilitation and operation of historic transportation buildings, structures, or facilities (including historic railroad facilities and canals), preservation of abandoned railway corridors (including the conservation and use thereof for pedestrian or bicycle trails), control and removal of outdoor advertising, archeological planning and research, environmental mitigation to address water pollution due to highway runoff or reduce vehicle caused wildlife mortality while maintaining habitat connectivity, and establishment of transportation museums.



The Utah Transportation Commission, with the help of an advisory committee, decides which projects will be programmed and placed on the Statewide Transportation Improvement Program (STIP). Applications are accepted in an annual cycle for the limited funds available to UDOT for such

projects. Information and Applications for the current cycle can be found on UDOT's homepage @ www.udot.utah.gov, tab on "Doing Business" select "Planning and Programming", here you will find a sub-topic entitled "Transportation Enhancement Program". The UDOT Program Development Office, on or before the specified date to be considered, must receive applications. Projects will compete on a statewide basis.

5.4. Transportation Corridor Preservation

Transportation Corridor Preservation will be introduced as a method of helping Tropic's Community Transportation Plan. This section will define what Corridor Preservation is and ways to use it to help the Community Transportation Plan succeed for the Town.

5.4.1. Definition

Transportation Corridor Preservation is the reserving of land for use in building roadways that will function now and can be expanded at a later date. It is a planning tool that will reduce future hardships on the public and the town. The land along the corridor is protected for building the roadway and maintaining the right-of-way for future expansion by a variety of methods, some of which will be discussed here.

5.4.2. Corridor Preservation Techniques

There are three main ways that a transportation corridor can be preserved. The three ways are acquisition, police powers, and voluntary agreements and

government inducements. Under each of these are many sub-categories. The main methods will be discussed here, with a listing of some of the sub-categories.

5.4.2.1. Acquisition

One way to preserve a transportation corridor is to acquire the property by exaction or by outright purchase. The property acquired can be developed or undeveloped. When the town is able to acquire undeveloped property, the town has the ability to build without greatly impacting the public. On the other hand, acquiring developed land can be very expensive and can create a negative image for the Town. Acquisition of land should be the last resort in any of the cases for Transportation Corridor Preservation. The following is a list of some ways that land can be acquired.

- Development Easements
- Public Land Exchanges
- Private Land Trusts
- Advance Purchase and Eminent Domain
- Hardship Acquisition
- Purchase Options

5.4.2.2. Exercise of Police Powers

Police powers are those ordinances that are enacted by a municipality in order to control some of the aspects of the community. There are ordinances that can be helpful in preserving corridors for the Community Transportation Plan. Many of the

ordinances that can be used for corridor preservation are for future developments in the community. These can be controversial, but can be initially less intrusive.

- Impact Fees and Exactions
- Setback Ordinances
- Official Maps or Maps of Reservation
- Adequate Public Facilities and Concurrency Requirements



5.4.2.3. Voluntary Agreements and Governmental Inducements

Voluntary agreements and governmental inducements rely on the good will of both the developers and the municipality. Many times it is a give and take situation where both parties could benefit in the end. The developer will likely have a better-developed area and the municipality will be able to preserve the corridor for transportation in and around the development. Listed below are some of the voluntary agreements and governmental inducements that can be used in order to preserve transportation corridors in the city limits.

- Voluntary Platting
- Transfer of Development Rights
- Tax Abatement
- Agricultural Zoning

Each of these methods has its place, but there is an order that any government should try to use. Voluntary agreements and government inducements should be used, if possible, before any police powers are used. Dedication and police powers should be tried before acquisition is sought.

Other Relevant Data

(On the following pages)

- 5.4.3. Zoning Map**
- 5.4.4. Travel Forecast Sheets**
- 5.4.5. Suggested types of street cross-sections**